



How do we stop global warming?

DIFFERENCE BETWEEN CS, CCS AND N-CCS



CO₂ in the atmosphere

According to a team of French and American geophysicists, earth's atmosphere 3.8 billion years ago contained 250 times as much carbon dioxide (CO₂) as it does today.

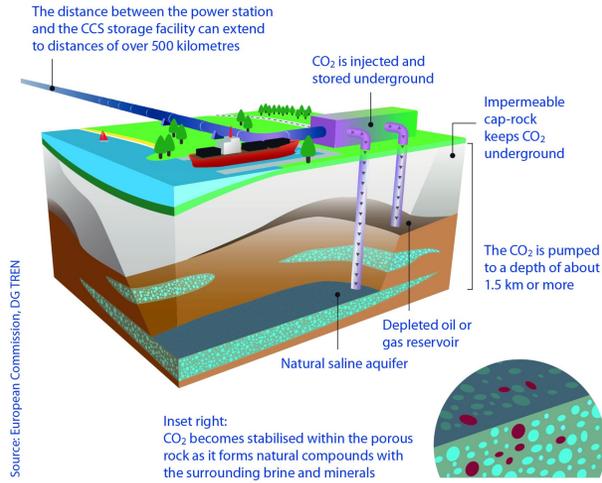
2.5 billion years ago, the CO₂ content would have decreased to 25 times the current level.

All this time, the Earth's atmosphere contained about a thousand times as much methane gas as it does today.

If we follow the current course, we will not be able to meet the targets and the earth will continue to warm. In this document you can read how it is possible to keep the earth habitable.



Carbon Capture and Storage (CCS)



What is meant by CCS?

Carbon Capture and Storage (CCS) is a name for a mechanical system that concentrates CO₂ by means of machines and energy supply and stores it underground via pipes as gas.

How post-combustion carbon capture works

EXTRACTION



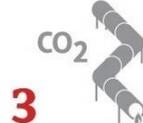
Carbon dioxide and sulphur dioxide are separated from other emissions at plant ...

TRANSFORMATION



... then filtered, compressed and transformed into liquid ...

STORAGE



... then piped to storage facilities where...

INJECTION



... it is pumped 1-4 km underground, sealed and monitored.





The already known data of CCS.

CCS is a name for the industrial reduction of CO₂ in the Atmosphere.

In the USA, \$27 billion has already been spent on 12 projects, 8 of which have been closed with the result that it is not feasible.

4 projects are "Pending".

The Netherlands still thinks that we will succeed.



The CS Idea

Carbon in roots of plants

Climate Smart Agriculture Management Practices

Cover crop

Conservation tillage

Biochar

+6%

Environmental factors

- Climate
- Sampling depth
- Soil texture
- Soil pH

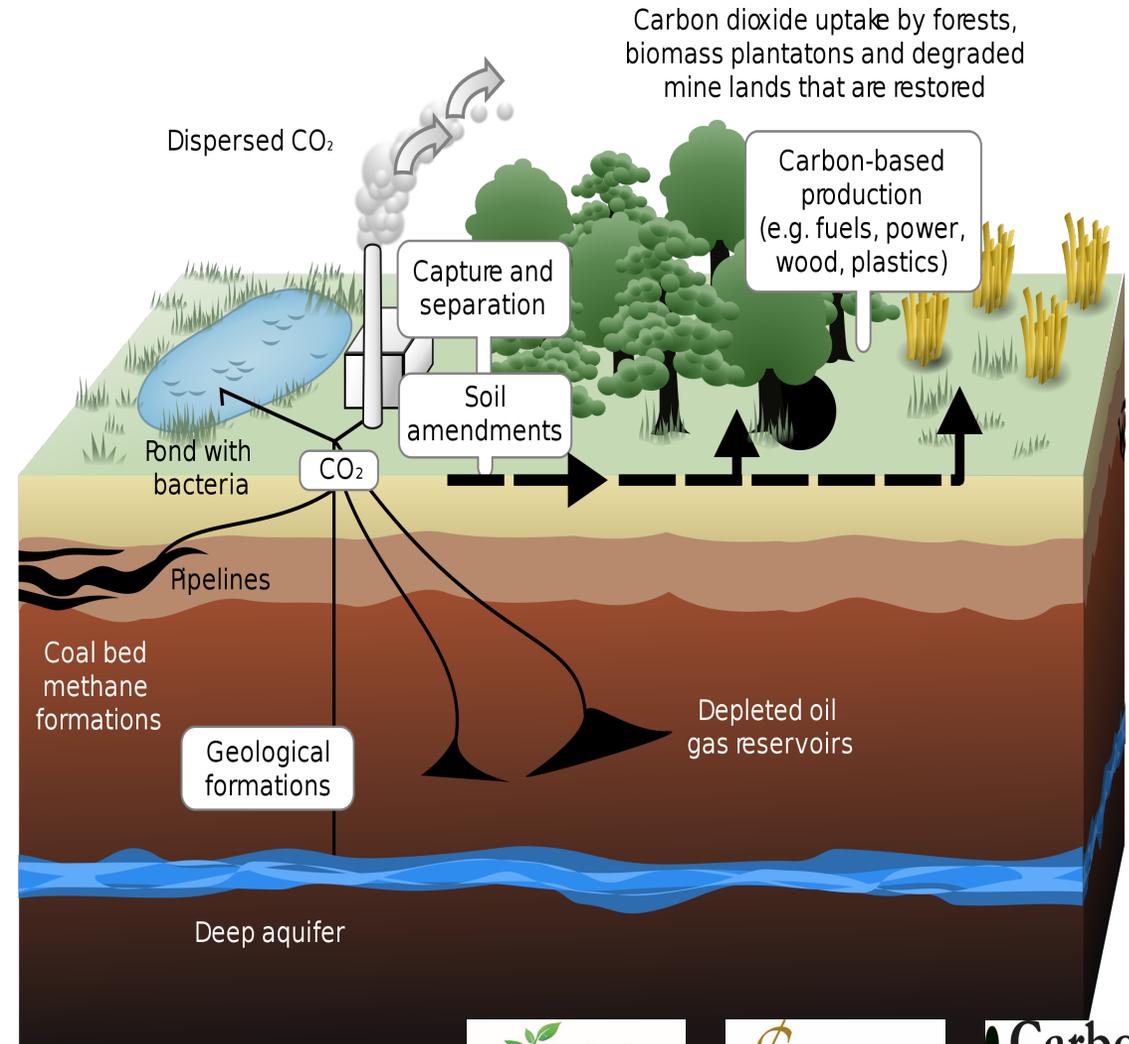
+5%

Other agronomic practices

- Nitrogen fertilization
- Residue treatment
- Irrigation
- Crop rotation

+39%

Soil Organic Carbon (SOC)



Carbon Sequestration techniques, CS

CS is completely different from n-CCS!

Agroforestry:

Agroforestry is the practice of introducing trees into agricultural systems.

This can be in grasslands, but also on arable fields.

Trees fix CO₂ from the atmosphere in stems, leaves and their extensive rooting system.

Especially roots will increase the carbon content in the soil also in deeper soil layers.

A higher carbon content in the soil offers many benefits for the health and fertility of the soil: improved soil structure, increased soil biodiversity and a better water holding capacity and availability of nutrients.

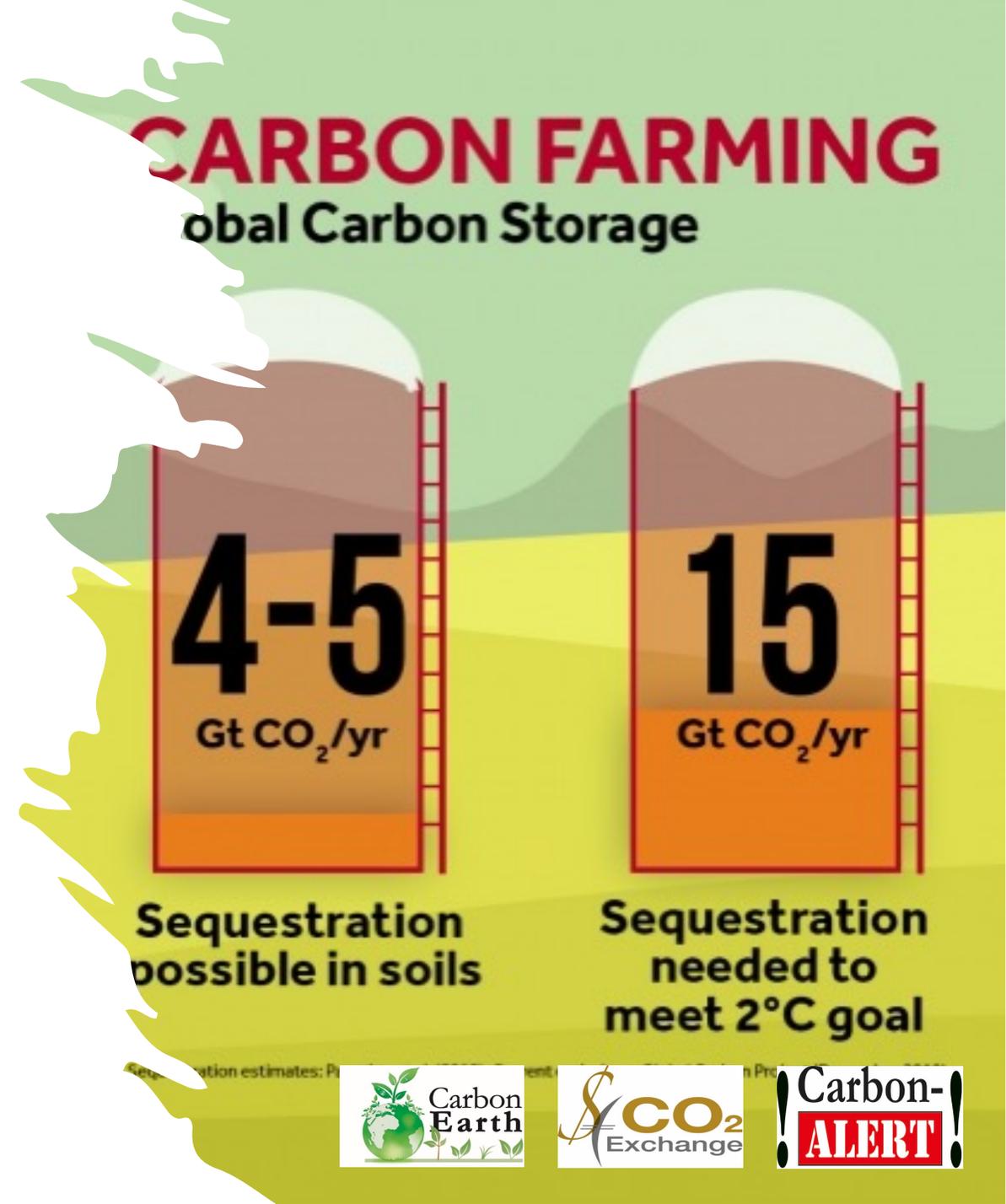


How far does Carbon Sequestration go ?

We know that 30 Gigatons of CO₂ per year must be stored in our current way of life.

Carbon Farming will therefore contribute a maximum of 13-17%. (4-5 Gt CO₂/Yr)

Reducing emissions worldwide can also only reduce a part. The current emissions worldwide are 32.5 Gt CO₂/Yr. By pricing, it can decrease to 28 Gt CO₂/Yr. (Prognosis)



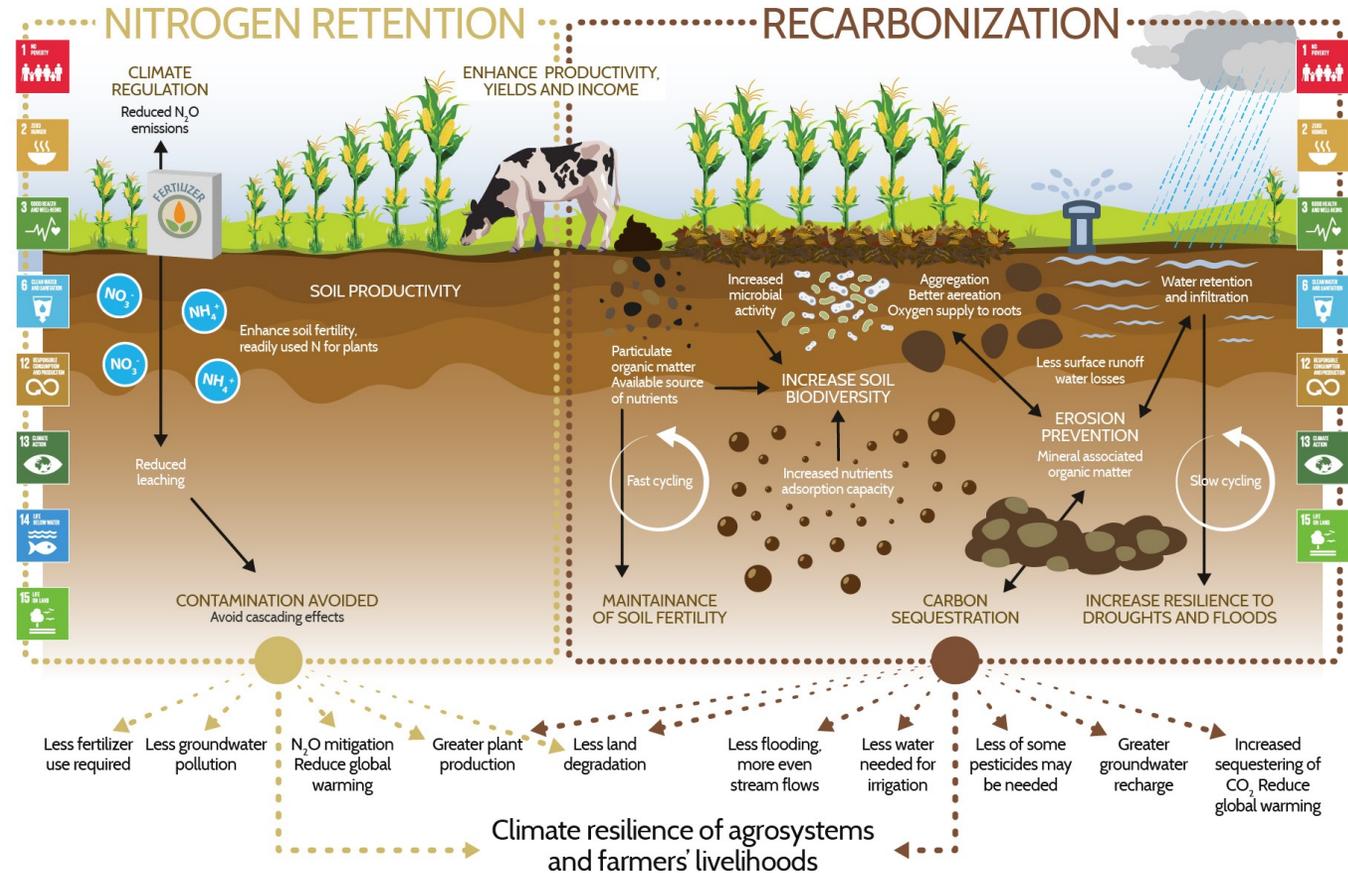
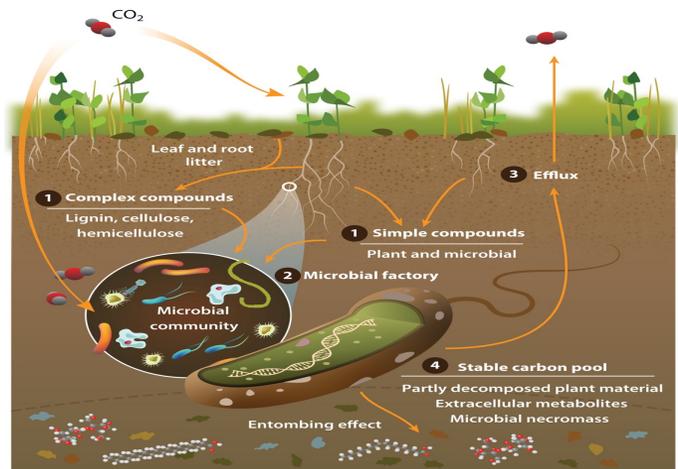
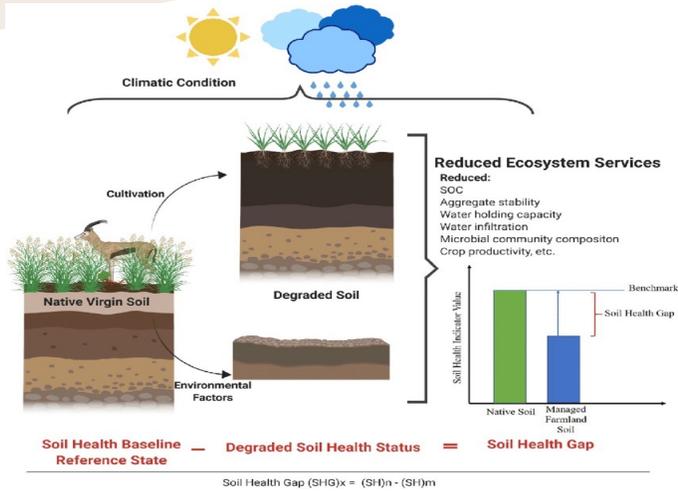
How does n-CCS work?

N-CCS (Natural CCS) is a Carbon Capturing and Storage system, which works differently than CS and CCS!

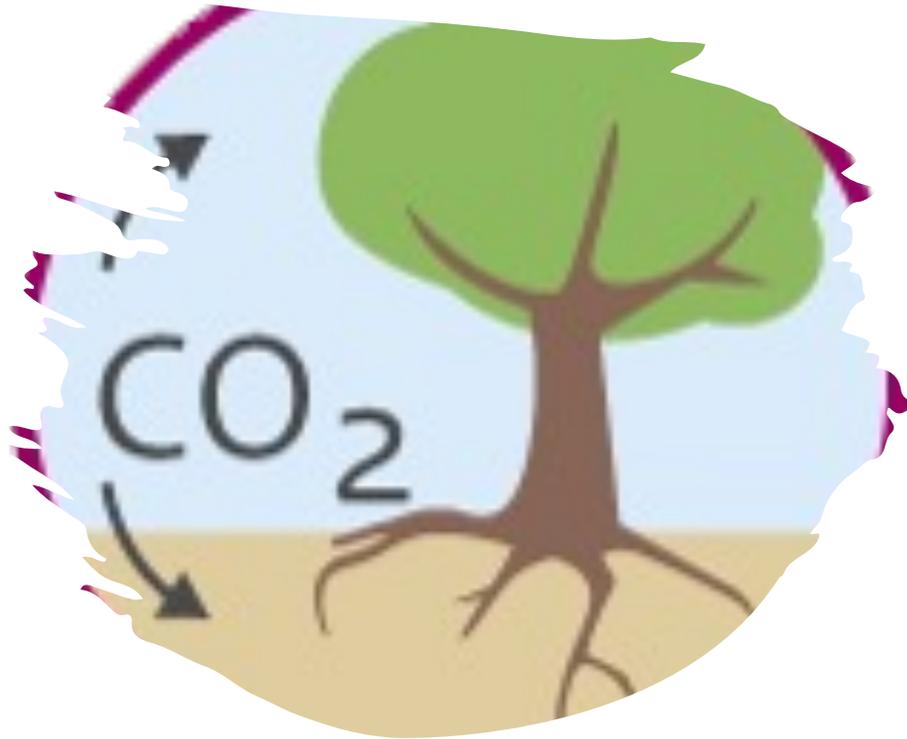
- The Energy for Carbon Capturing comes entirely from the SUN!;
- This is done by specially modified C4 crops, which grow extremely fast. (up to 5 meters in 2 months);
- Part (about 25 %) of the absorbed carbon is fixed in the roots of the plant;
- These roots are located in the soil layer 0-75 cm deep;
- Almost all plants have their roots in the upper layers up to 75 cm deep;
- Above ground, the C4 Grass grows and that contains a huge amount of hydrocarbons;
- The grass is harvested 3-4 times a year and stored underground (injected deeper than the root mass);
- This carbon storage takes place in a soil layer below the root mass (minus 1 mtr. deep) and is therefore unable to decompose, this requires oxygen (O₂), which cannot get through the thick soil layer. A kind of "uncomposed peat layer" is created! (The biomass acidifies the soil and thus stops the microben growth);
- This makes it possible to inject a lot of carbon material under the upper soil layers on a small surface;
- **The method is therefore not comparable to CS, Carbon Sequestration, which only covers the top 75 cm!**
- There is one drawback to this system, the temperature should, ideally, be above 20 degrees Celsius all year round day and night;
- **So ideally suited for use in the tropics!**
- **Also in Europe there is a suitable species of this crop, only with a lower CO₂ yield.**



Soil knowledge above the n-CCS layer



CO₂ storage in the soil; the best way



- Problem: There is far too much CO₂ in the atmosphere, causing the earth to warm up. To be precise, 300 parts per million is normal and 350 is the upper limit. We are regularly above that, so we will have to store CO₂ to remove/keep the CO₂ out of the air.
- When it is written about storing CO₂ in the soil, they usually mean something completely different than we mean here.
- We mean the natural way to store CO₂ in the soil, namely in the humus layer. 8 tons of CO₂ per hectare can be stored there. The ecovillage consists of 3.8ha of land, of which a small part is used for buildings and a road.
- So we are going to store about 3ha of CO₂ in the soil and much more in the vegetation above it. That is at least 24 tons of CO₂ or 24,000 kilos. Comparable to a pound of cheese, that's 48,000 blocks of cheese. That's a lot of cheese!
- What we also do is leave the soil alone, so that the humus layer will become thicker and thicker. Every time the soil is turned over, organisms die because they suddenly find themselves in a place where they cannot survive. Read more about humus and CO₂ here.
- By leaving the soil alone, a cycle is created in which dead organisms are eaten by other organisms, leaving the carbon in the soil. If it is not eaten, then the cycle is broken and under the influence of oxygen it disappears into the atmosphere where it does annoying things, such as warming the sea.



Trading CO2 Certificates



CO2 CERTIFICATES
CREATED IN THE
TROPICS ARE NOT
ACCEPTED IN EUROPE,
OR THE NETHERLANDS.



THE ONLY TROPICAL
AREA IS SURINAME,
DUTCH KINGDOM.



THESE MAY ONLY
SERVE AS AN AID IN
SALES FOR
COMPANIES.



SO THE TRADING
PRICE IS FAR BELOW
THE ACTUAL VALUE.

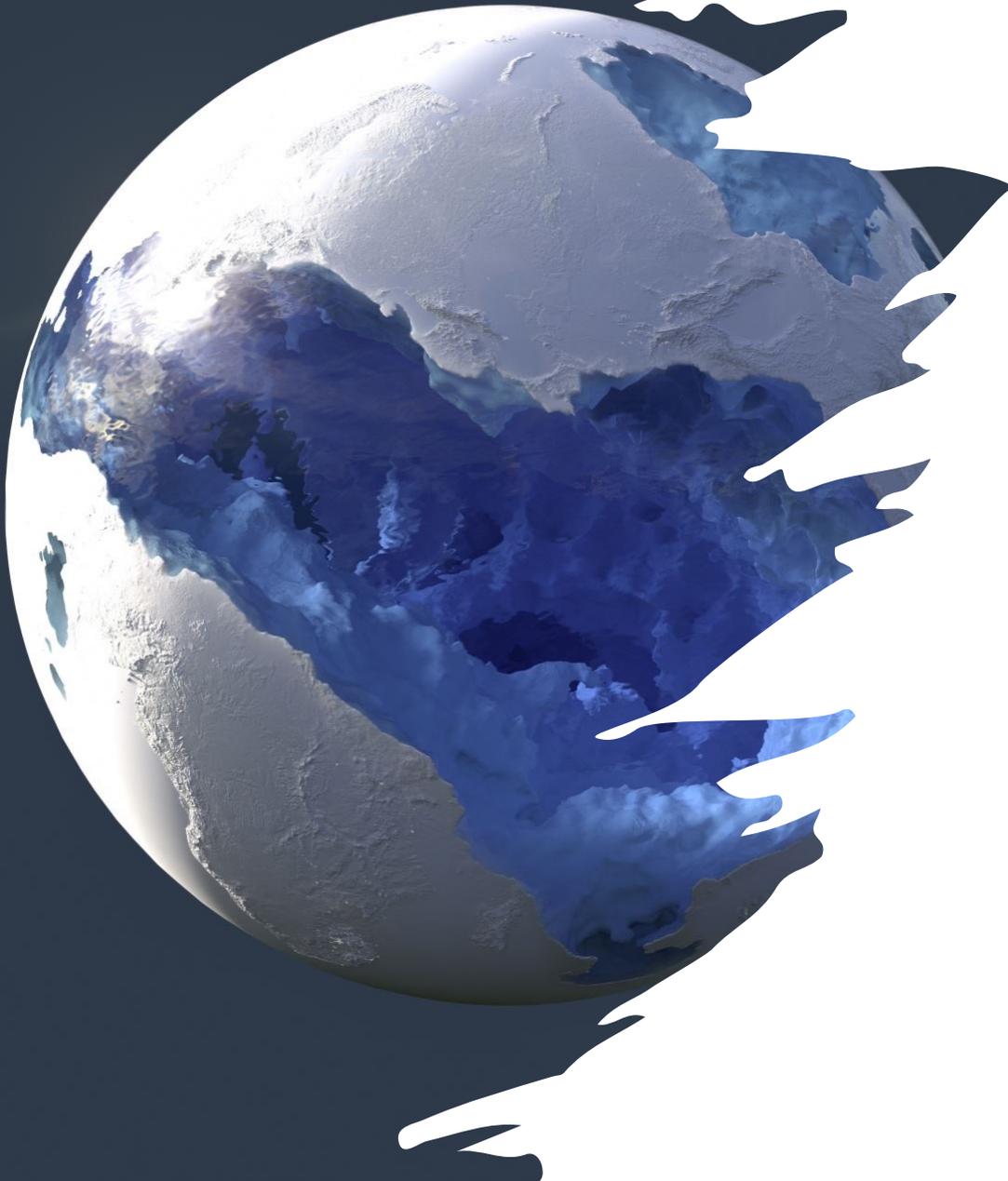
It is therefore important to make the Certificates so secure that there is complete confidence in their processing and that the certificates are allowed in Europe.



Is it possible to price these Certificates as a global objective?

- **For example, the Netherlands:**
- The Netherlands emit approximately 160-170 million tonnes of CO₂ per year;
- We invest billions annually in subsidies for solar cells, wind energy, shutting down coal-fired power stations, constructing CCS from the port of Rotterdam, etc. etc.;
- In a country like Suriname, Columbia or Venezuela, hundreds of thousands of hectares of land are available for this n-CCS;
- To reduce the emissions of the Netherlands by 50%, we need approx. 55x 55 km (85 Gt Co₂ /Yr);
- To compensate for the emissions of the whole of the Netherlands, a plot of 80 x 80 km is sufficient;
- At a price of € 75.- per ton, this would cost the Netherlands € 14.4 billion, a pittance compared to the current subsidies!
- When trading on the mandatory European Stock Exchange (ETS), companies are obliged to buy emission rights without reducing CO₂ in return.





Solving the CO₂ problem

- Worldwide, we blow about 30 GigaTons of Co₂ into the air every year;
- Via n-CCS, a place of 1000 x 1000 km is needed in the tropics, making us completely Co₂ Neutral;
- Under the ground, the space is enough to allow this to continue for hundreds of years.
- The approach should be done in a way where the supplier of oil, coal and gas must provide full compensation, controlled by a UNoC,

United Nations of Climate

This System must be able to issue claims if the Clean Energy Concept is not met.



EU rules for CO₂ reduction

Contribution ID: 60c38c6d-f5f3-43cc-b9cd-399e8823e2ea Date: 02/05/2022 16:18:58

1. Quality of the measurement;
2. Monitoring of the process;
3. Reporting and verification of carbon removed from the atmosphere;
4. The duration of storage;
5. The risk of reversal;
6. The risk of carbon leakage, which increases greenhouse gas emissions elsewhere.



Quality of measurement

The Carbon Injector is a new computer controlled machine that is able to store the biomass deep below the surface.
The biomass flow is fully measured in terms of carbon mass.

This is done by photo spectrometrically measuring how much of the flowed mass is carbon

GPS Data and the carbon calculation indicate the amount of carbon injected, where, at what depth and when

The systems are tested interval-wise and an intelligent system (AI) checks the measurements on the spot and registers deviations that could be fraudulent.



Monitoring of the process

The process of mowing and injecting is tested interval-based

A second test line lies in satellite registration

A third in the intelligent "on board system"



Reporting and verification of carbon removed from the atmosphere

Store the various data from the storage via an extremely stable database for further inspection and verification

External verification companies, which have been validated, agree to the accuracy of the data

The database stores all data about the system, including the validation data that is entered by these companies. They validate the data data in the database.



The duration of storage

The storage takes place in a new peat bog layer to be constructed

Peat bogs have a storage period depending on water levels and soil structures that block the supply of oxygen.

The soil conditions and the water levels must be carefully looked at, but at a depth of one meter we reach storage times of hundreds of years.

At a water level of 20-70 cm, which is fairly normal, the decay of the biomass turns out to be practically nil.

If the groundwater level is lower than one meter below the soil, at least 95% of the carbon will still be stored after 100 years.





The risk of reversal

- Reversal of the process can be done by exposing the fen and will therefore have to be monitored by satellite images;
- Exposure can occur, among other things, due to a decrease in water levels.



The risk of carbon leakage, which increases greenhouse gas emissions elsewhere.

- Not applicable, as no gas is stored.



What are carbon credits and carbon offsets?

- The terms are often used interchangeably, but carbon credits and carbon offsets work on different mechanisms;
- Carbon credits, also known as carbon allowances, act as consent notes for emissions. When a company buys a carbon credit, usually from the government, they get permission to generate a ton of CO₂ emissions;
- With carbon credits, carbon revenues flow vertically from companies to regulators, although companies that end up with excess credit can sell them to other companies;
- Offsets flow horizontally and trade carbon revenues between companies;
- When a company removes a unit of carbon from the atmosphere as part of their normal business, they can generate a carbon offset;
- Other companies can then buy that carbon offset to reduce their own carbon footprint;
- Note that the two terms are sometimes used interchangeably and carbon offsets are often referred to as "offset credits";
- However, this distinction between regulatory compliance credits and voluntary compensation should be kept in mind.



Sustainability of peat

- **Processes and deposits**

- Peat is a brown-black substance that consists of semi-digested plant remains. The dead plant remains have fallen off and ended up under water.
- In peat water there is an acidic environment, because humic acids are released during the breakdown of dead plants.
- In this acidic environment, bacteria and fungi cannot thrive properly, causing the breakdown of plants and other organic matter to be very slow and even to come to a complete halt in the deeper layers of the peat. In addition, the already little oxygen present is almost completely consumed, so that anoxic (oxygen-free) conditions prevail in the water.
- Rotting can therefore not take place, because rotting bacteria need oxygen.
- In the marshes, therefore, optimal conditions arise for the accumulation of organic material.
- In peat layers, complete tree trunks can be preserved for thousands of years.
- In the Drenthe raised bogs, perfectly preserved bodies have been found of people who lived around the beginning of the era (so-called peat bodies). The acidic peat water has tanned the skin of these people, as it were.



Photosynthesis

To understand this unique symbiosis, we need chemistry.

This is the most important chemical reaction on our planet, "photosynthesis", which is written down in a simplified formula form as follows:

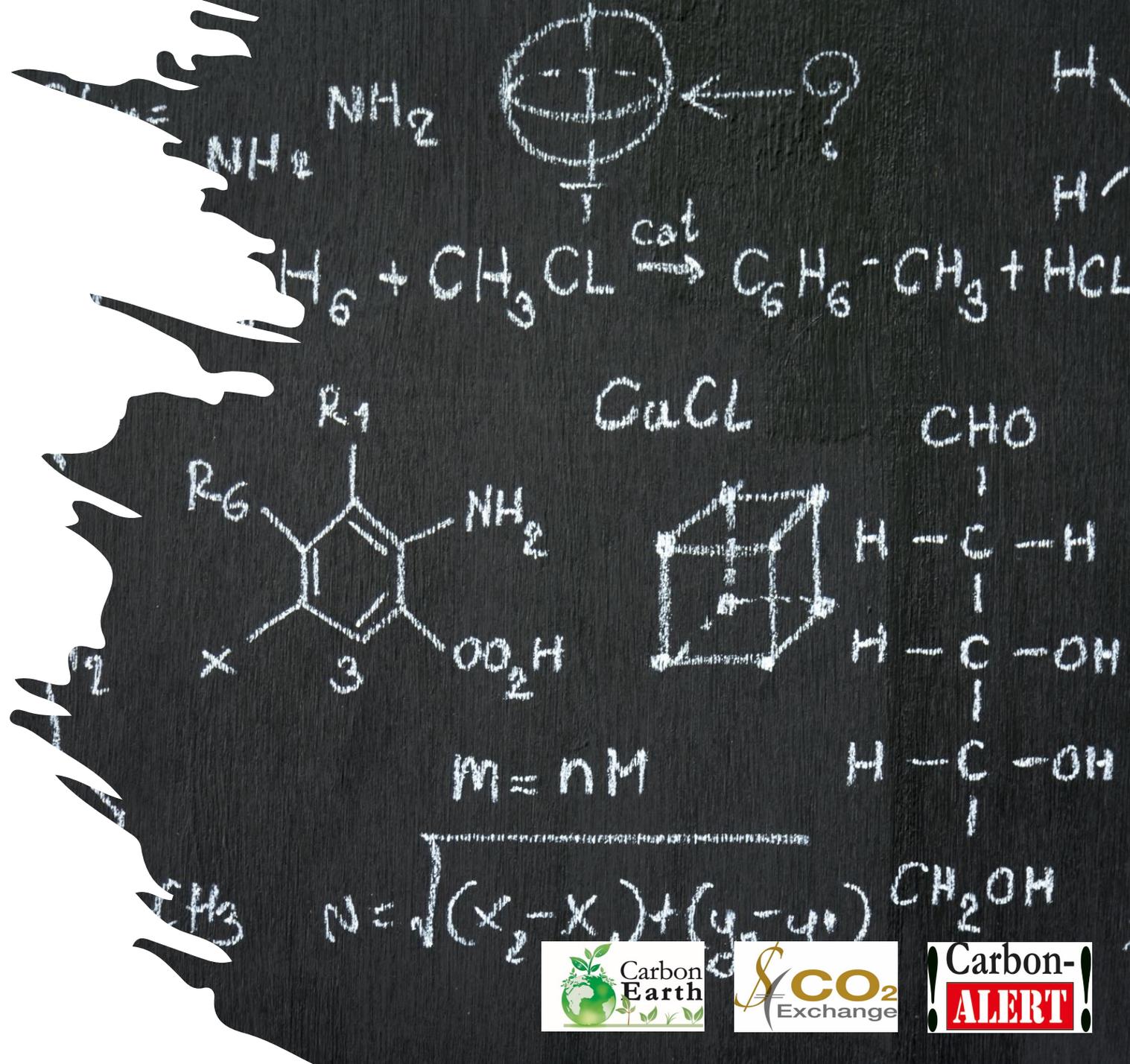


In plain English it says that carbon dioxide (CO₂) and water (H₂O) combine to form a carbohydrate (CH₂O)_n in which oxygen (O₂) is released.

This can only happen under the influence of sunlight and catalysts present in the plant.

Note that for glucose (grape sugar) n=6.

Humans have not yet succeeded in simply imitating this impressive chemical conversion in the laboratory.



Improved Photosynthesis

- **BETTER PHOTOSYNTHESIS MEANS MORE CROP YIELD**
- **If photosynthesis goes twice as fast, plants give twice as much yield**
- But this whole process is not very efficient. Agricultural crops use only 0.5 to 1 percent of the incident sunlight. Wur's chair Louise Fresco even calls improving photosynthesis the holy grail of agriculture. "If photosynthesis runs twice as fast, plants give twice as much yield," explains Klein Lankhorst. The larger the plant, the more CO₂ it absorbs. That evokes visions of CO₂-guzzling fields full of fast-growing crops.
- "More efficient crops are good for the climate," says Klein Lankhorst. "As is well known, the world's food acreage is under enormous pressure. By 2050, we will have to feed 10 billion mouths. Prosperity is rising and the production of animal feed for the growing livestock population is increasingly taking up the agricultural area."
- **Plants use sunlight to produce their own nutrients and energy: photosynthesis. If we want to keep the planet and its growing population running sustainably, we need plants to produce much more food, energy and biomass than is currently the case.**



AGRI- CULTURAL LAND IS USED MORE EFFICIENTLY

Klein Lankhorst continues: "At the same time, we want to phase out fossil fuels – which are bad for the climate – and replace them with green fuels where necessary. Industry must also work circularly and switch to sustainable, biobased raw materials. For green fuels and biobased raw materials together, an additional 30 percent of the world's agricultural area is needed."

In order to complete this picture without cutting down the last tropical rainforests, we will have to use the available world agricultural area much more efficiently, says Klein Lankhorst. Improving photosynthesis plays a key role in this. With traditional breeding methods, global yields are growing by 1 percent per year, but many crops are gradually reaching their ceiling. For example, in countries such as China and South Korea, rice yields have not increased for ten years and European wheat yields have been on a plateau for a number of years. "It is high time for a new approach. Photosynthesis is the only property that has never been studied before."



Natural Carbon Capture & Storage (nCCS) is the future and therefore the way forward.

Project Colombia

Carbon storage, as nature did a million years earlier.



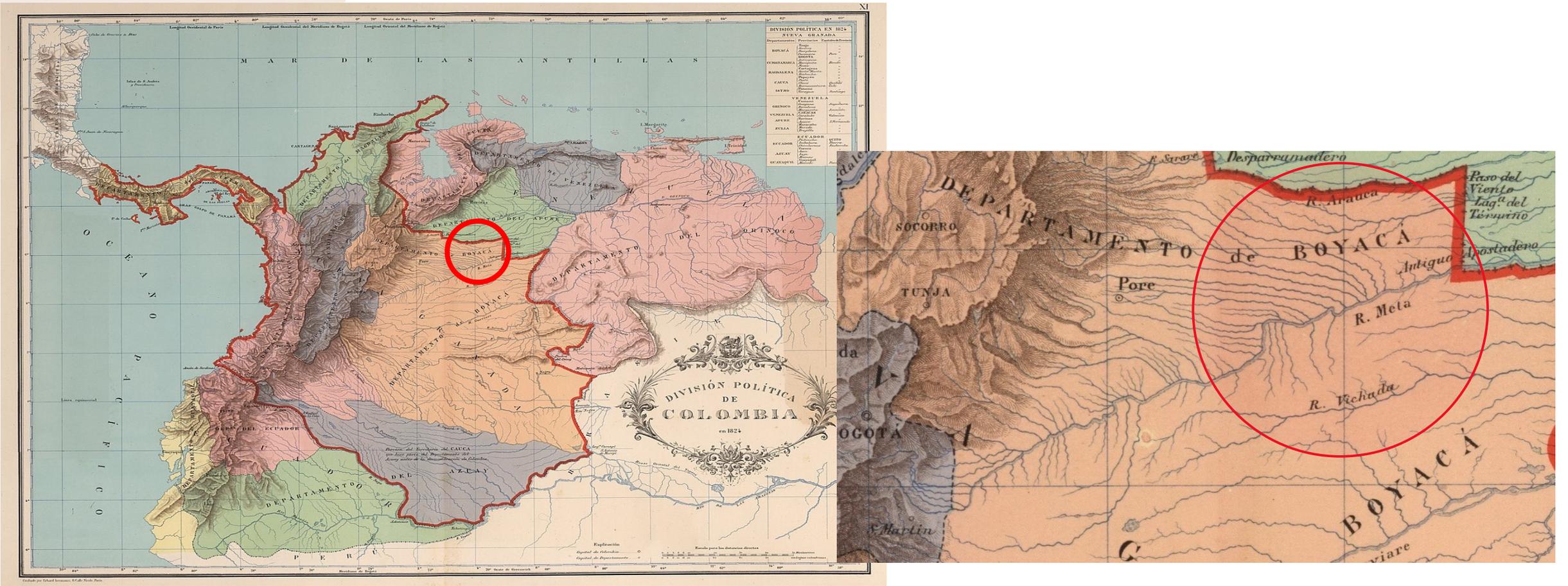
Current view of the locations



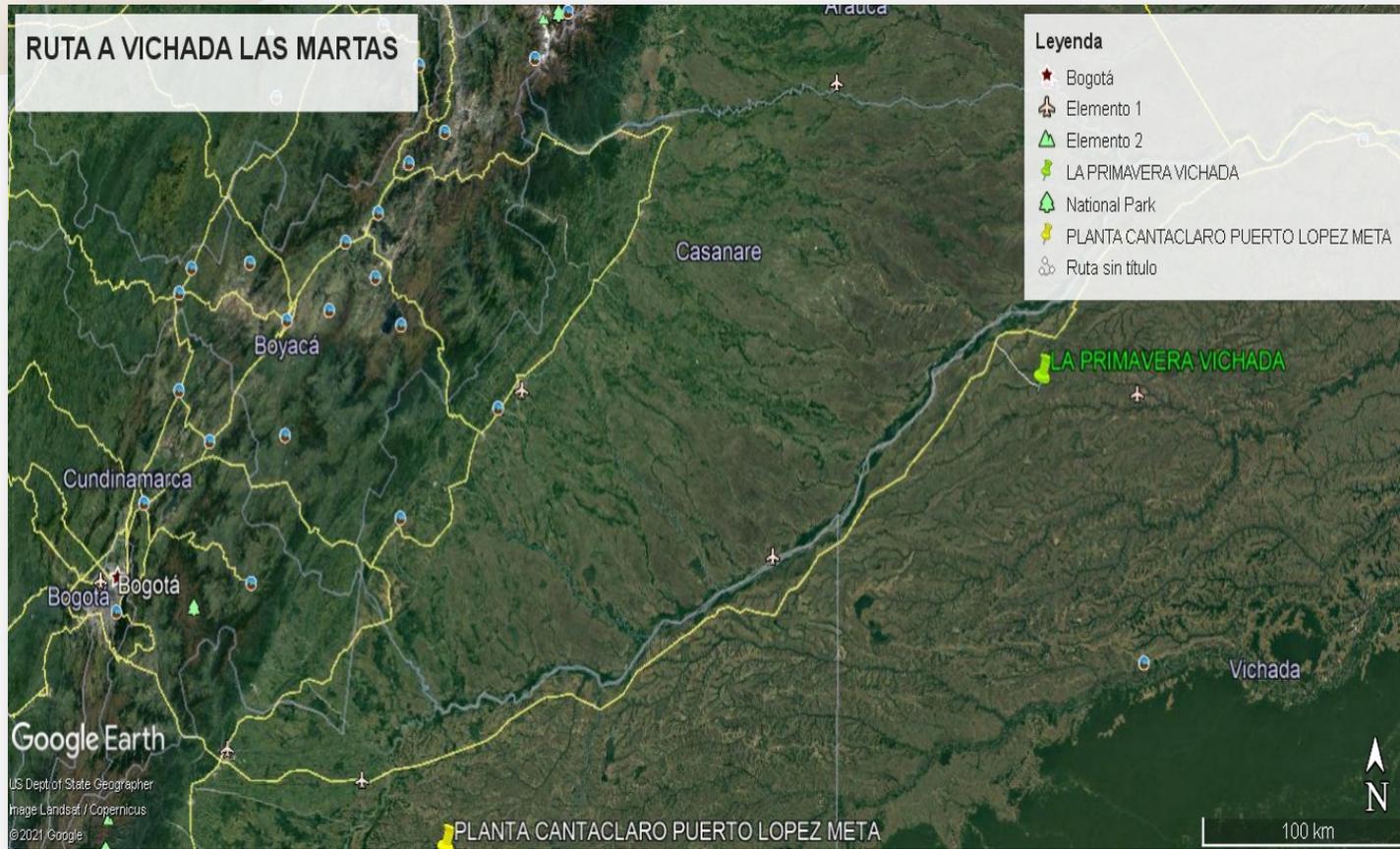
Impression of the location with new plants



Columbia map and mountains



Location Google Earth



Water is sufficiently available



PROJECTION

Work will be done on growing a new type of C4 Gras, **the Giant Juncao.**

This new grass species has been specially developed for extreme Carbon (CO₂) absorption.

We have linked a technique to this, which permanently stores the bound CO₂ at a depth of at least 1 meter, where the conditions are such that the weathering of the plant remains stands still and peat bogs are created.

This is due to the practically impossible supply of oxygen from the air.

From:
Peat formation, dr. J. Visscher
publication Geopark Heuvelrug Gooi en
Vecht

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjFte3Oia_4AhW4wAIHHRKoAx0QFnoECCEQ_AQ&url=https%3A%2F%2Fwww.geopark-heuvelrug.nl%2Fwp-content%2Fuploads%2Fveenvorming-JanVisscher.pdf&usq=AOvVaw1zsla53Gby9kZ6jxh5MLi





Biological characteristics of new grass species

- It is a tall, upright, bushy perennial, which has a highly developed root system. The growth height can be up to approx. 7 meters, but is normally 4 to 5 m high and the diameter of the stem is usually 1.5 to 2.5 cm.
- Typical C4 carbon plant with high photosynthesis efficiency



Specially developed for CO₂ uptake in rainforest areas

As a base from North Africa.

Superior growth yields of up to 850 tonnes/Ha.

The grass has a re-growth capacity of more than 20 years.
(sustainable planting)

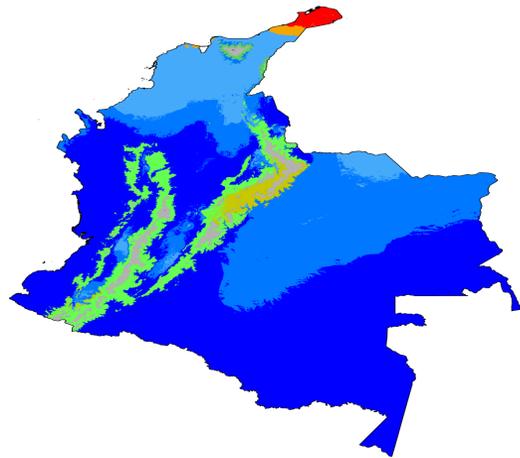
Root growth of an average of 25% of the above-ground growth,
the first year even to about 89%.

The grass is harvested about 3 times a year and stored as carbon sink.

As a result, an annual CO₂ storage of up to approx. 360 tons



Grass cannot be sown, so supply as cuttings per container



- Tropical, rainforest (Af)
- Tropical, monsoon (Am)
- Tropical, savannah (Aw)
- Arid, desert, hot (BWh)
- Arid, steppe, hot (BSh)
- Temperate, dry summer, warm summer (Csb)
- Temperate, dry summer, cold summer (Csc)
- Temperate, dry winter, warm summer (Cwb)
- Temperate, dry winter, cold summer (Cwc)
- Temperate, no dry season, warm summer (Cf)
- Temperate, no dry season, cold summer (Cfc)
- Polar, tundra (ET)
- Polar, frost (EF)



Machines for planting grass, conforming to sugar cane plants.

Manual planting



Plant tractor

Tractor planted





The first year the cuttings must be irrigated

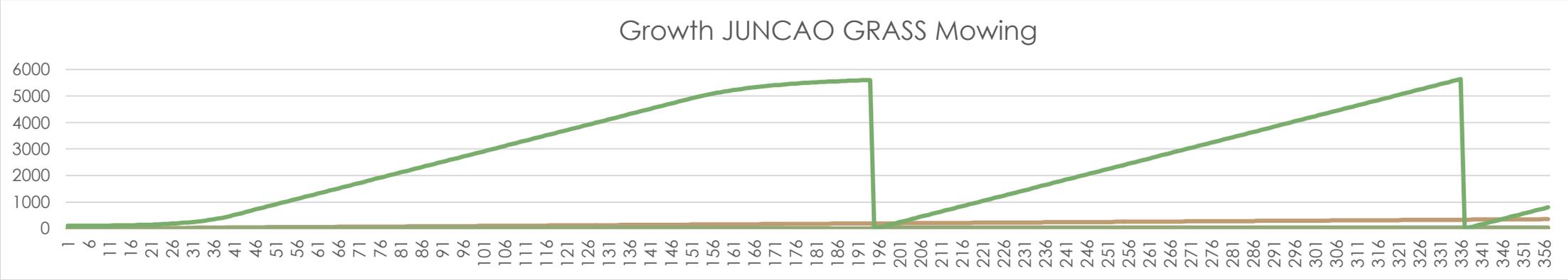


Harvesting is done by combines



Growth charts:

<http://viaspacegreenenergy.com/giant-king-grass.php>



- The first mowing takes place later in the first year of planting.
- In the following years, mowing about 3 times a year, per mowing about 280 tons of fresh grass.
- The processing is done by large combines, or by sugar beet harvesters.



The Carbon Injector



The Carbon Injector has been developed to inject the carbon (CO₂) stored in the plant into the soil, in such a way that the conversion to CO₂ does not or hardly takes place.



A major advantage of the chosen method is that the CO₂ enriches the soil, so that afterwards many types of plants, interesting for the food supply, can be grown.



The chosen system makes it possible to measure and record the amount of CO₂ injected with adjacent absolute certainty.



This data is automatically stored by Co₂-Exchange in a blockchain registration system via secure data transmission, and is checked and verified by external resources.



The cross-section of an average soil

The depths are in inches.

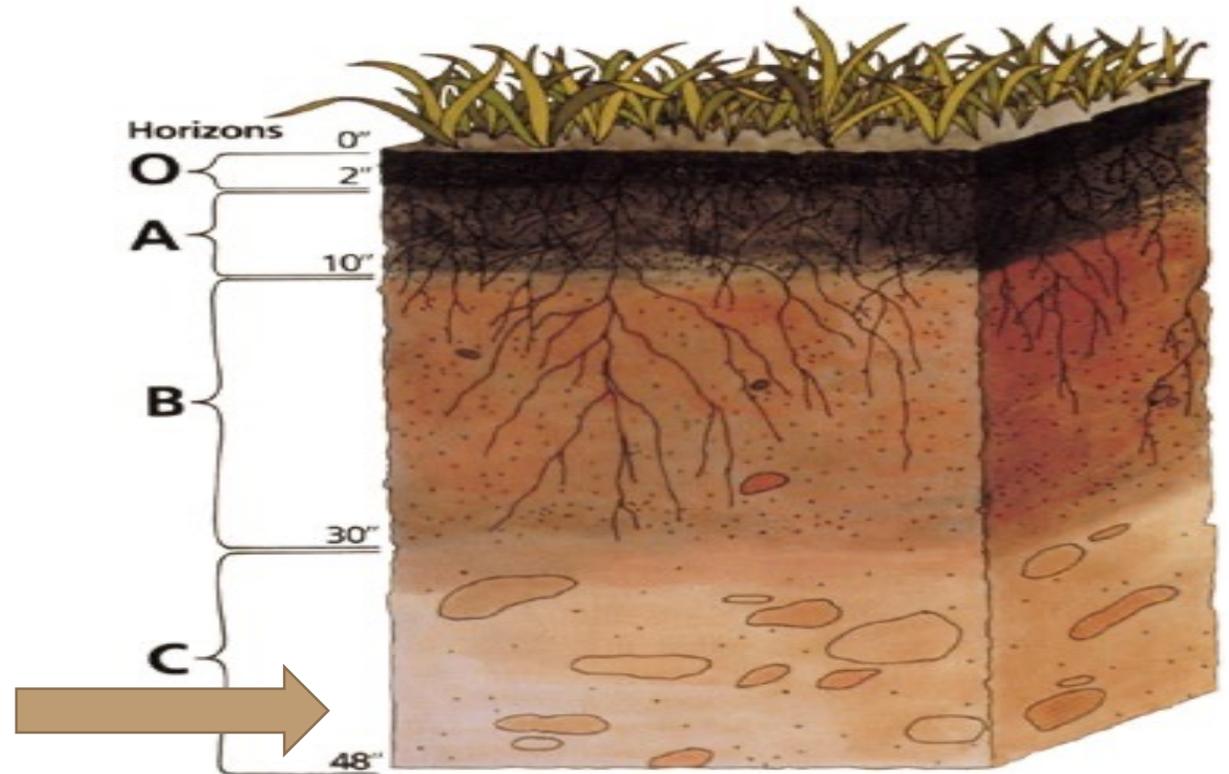
2" = 5 cm

10" = 25 cm

30" = 75 cm

48" = 120 cm

Injection depth





Freeing up the CO₂ of our society:

- By freeing up the world trade of CO₂ certificates, we can free up all processes in the world at a small overpricing price.
- For this, it is necessary that we see the CO₂ problem as a global problem and accept the trade in it worldwide.
- The Netherlands under Europe has signed a covenant, in which they do not accept certificates outside Europe!
- As a result, a world initiative for the Netherlands(Europe) has been cut off!!!!



- Carbon-Alert is in charge of all processes and developments, customers are provided with the right information, so that the process is carried out efficiently.
- Carbon-Alert also provides advice regarding certification and accreditation by external control institutes that, among other things, carry out verification of the method.
- Carbon-Alert is also a possible partner for partnerships.
- Carbon-Alert mediates in the purchase of the necessary machines and is the contact partner for, for example, lease contracts for this.
- Carbon-Alert is the supplier for the basic rhizomes (cuttings) for (grass) cultivation.

! Carbon- !

ALERT

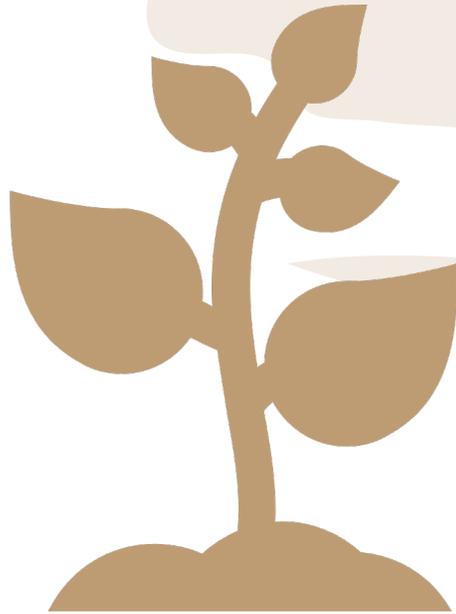


- At Carbon-Earth, all kinds of plants and grasses are examined, with the aim of allowing the CCS to thrive as well as possible in all kinds of countries, climates and provinces. Sometimes it may be necessary to grow several plants in a row in a year.
- The methods for weed protection and (artificial) fertilization are also selected here.
- The data is processed in a manual and instruction, the actual actions can be carried out by the user himself.



- CO2 Exchange is the Co2 Bank, which holds all data for verification control and Co2 movements in a secure Database, called "BLOCKCHAIN".
- This Blockchain database is one of the most well-known and reliable in this world.
- The programming of this registration system is based on the software, which is fully accepted and accredited for the gold market.
- In this precarious market, everything must be fully traceable without any hiccups; there is a lot of hot air!
- CO2 Exchange is therefore one of the most important CO2 partners of governments. The guarantees of the data offered are extremely high.
- CO2 Exchange issues the unique certificates associated with the stored CO2.





The entire process offers several options:

1. Storing CO₂, with the associated CO₂ certificates;
2. Greening the Deserts, the plant can withstand drought and heat;
3. The production of Biomass, in the form of pellets, to replace Natural Gas;
4. Producing Bioethanol, a fuel for aircraft;
5. Producing "Green Plastic" with 76% carbon content, for storage of CO₂ above ground;
6. 100% Offsetting Energy Carriers, Coal, Oil, Gas;
7. Et Cetera....



Sale of emission rights by the Dutch government

Dutch government earned nearly €900 million in sales of emission rights last year due to sharply higher prices

Due to the increased prices of emission rights, the Dutch government earned twice as much money from sales last year than the year before.

Companies must obtain part of the emission rights at an auction. (just ordinary tax increase!)

The prices of these CO2 allowances rose from around 30 euros at the beginning of last year to 85 euros in December 2021.

The Dutch government earns a lot from the sale of emission rights, because the prices for these 'CO2 rights' have risen sharply.

In 2021, sales yielded more than twice as much as the year before, according to the Dutch Emission Authority. With an emission allowance, electricity producers and industry in the European Union must compensate for their CO2 emissions.

A company can get part of the emission allowances for free, the rest must be purchased at an auction.

The price at the auction has risen considerably in the past year, from about 30 euros at the beginning of last year to 85 euros in December. That's a record.

There is a maximum quantity of allowances and it is decreasing every year.

Last year, the Netherlands sold more than 16 million of these rights, slightly less than one year previously. In 2018, this was still well above 25 million.

With the sale at auction, the Netherlands raised 893 million euros last year, compared to 441 million euros in 2020.

The Dutch Emission Authority auctions the allowances on behalf of the Netherlands.



In our opinion, the climate problem is a global problem and the solutions must therefore be sought worldwide, and not locally as Europe pretends!



It is therefore important that the EU and in any case the Netherlands must offer the opportunity to purchase the production of fully verified controlled CO₂ allowances for real greenhouse gas reductions as soon as possible!

The Netherlands should also support the development of CO₂ storage methods in tropical areas!

Development cooperation, with positive Climate objectives is better than ignoring possibilities!!

